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COLOR BLINDNESS

The requirement by the Army and Navy that both officers and men take tests to determine their color perception, and the subsequent rejection of thousands of applicants on the grounds of color deficiency has revived interest in color-blindness. Red-green deficiency, or reduced ability to discriminate any color from those of its neighbors which differ by being redder or greener, is fairly prevalent among healthy men, about 8 percent having this defect, 2 percent having so little ability of this sort that they are called red-green blind. This defect is transmitted congenitally by normal-visioned mothers to their sons, and is known as a sex-linked characteristic. Less than half of one percent of women have color deficient vision, though it is supposed that at least 8 percent are transmitters of it.

Red-green blindness was for many years, following Dalton's account of his own case in 1798, called Daltonism, and since that time has been the subject of an extensive literature. There are two sub-types of red-green blindness, one associated with deficient sensitivity to longwave (or red) light, the other associated with nearly normal sensitivity throughout the whole spectrum. Both types are said to correspond to reduction systems of normal vision, because a color match set up by a normal observer is also valid to a red-green-blind observer. There are corresponding types among the red-green deficients whose defect does not amount to blindness. These are said to have anomalous vision because in many cases a color match set up by a normal observer will to them appear sadly mismatched. Average characteristics of anomalous vision have not been determined; indeed, it is doubtful if an average would serve any useful purpose because individual differences are so large. Red-green blindness, however, runs more true to type and exact specifications of all the confusion colors for both sub-types are known and have been put into readily accessible form to aid in designing color-blindness tests. These facts are summarized in a paper entitled, "Facts of Color Blindness," by Deane B. Judd of the Bureau's Optics Division, which will be published in the June issue of the Journal of the Optical Society of America as the first of a series of papers on color-blindness. Other papers of the series are: Methodology in test preparation, by Forrest

[1] Published with approval of the Director of the Budget.

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L. Dimmick, Department of Psychology, Hobart College; The evolution of color-vision tests, by Elsie Murray, Department of Psychology, Cornell University; and The ISCC single judgment test for red-green discrimination, by LeGrand H. Hardy, Institute of Ophthalmology.

LEASE OF RAILROAD TRACK SCALE TEST WEIGHT CARS

The Bureau owns two self-contained railway track scale test cars, one of which weighs 40,000 and the other 80,000 pounds. Because of a shortage of funds and of trained personnel, it was necessary last year to withdraw these cars from service. In the belief that such facilities should not remain idle, a plan has been approved by the Secretary of Commerce whereby, under a "revocable license," any railroad company desiring to do so, may lease one or both of these cars for testing scales on its system. A rental figure of $8.00 a day was fixed after due consideration of the usual charges made by the railroads for the lease of equipment.

Under this plan, the 80,000-pound car has been turned over to a western railroad for approximately 2 months, and the lessee has notified the Bureau that the car will be requested at recurring periods until the company is able to procure equipment of its own. Another railroad is making inquiries about a similar arrangement.

The Bureau will be glad to hear from other railroad companies that may be interested in this service. Inquiries should be addressed to Ralph W. Smith, National Bureau of Standards, Washington, D. C.

NEW USES FOR BESSEMER STEEL

The development of the open-hearth steel-making process caused the use of Bessemer steel to decrease to an almost negligible total a few decades ago. In competition with the superior open-hearth product, it was considered suitable for only a few specific uses, such as free-machining steel. Recently, however, the process has been considerably improved, and this fact, together with today's unprecedented demand for steel, has led to the consideration of Bessemer for many more purposes.

An important contribution of the American steel industry to the war effort is the steel landing mat for constructing airplane runways. By using these interlocking mats, which are stamped out of heavy-gage sheet steel, a pasture can be converted into an airfield in a few days. Advice on the use of Bessemer steel for this specific application was requested of the Bureau by the Army Engineer Corps. On the basis of present information, there appeared to be no reason whatsoever for withholding approval of Bessemer steel for this purpose, and a recommendation was made accordingly. As a matter of fact, this would seem to be an almost ideal use for a steel which requires in its preparation only a fraction of an hour, instead of the 8 or 10 hours necessary for all other processes.

CATHODIC PROTECTION OF PIPE LINES

Cathodic protection as a means of preventing corrosion of buried pipe lines has been widely used for a number of years and experience has shown that a properly designed and maintained system is both satisfactory and economical.

Until recently, little has been known about the current density necessary to prevent corrosion. The common practice has been to cause current to flow from a buried anode to the structure in sufficient quantities to insure an arbitrarily chosen difference of potential between the structure and a reference electrode, or to cause the potential to decrease by a chosen amount which experience has shown to be sufficient to prevent corrosion. It has been shown that the potential of buried steel with respect to a reference electrode in the adjacent soil depends on the aeration and pH value of the soil and that the application of current to a buried structure may gradually raise or lower its potential, depending on the reactions resulting from the flow of current. It follows that neither the potential of the buried structure nor a specified change in the potential necessarily indicates its condition with respect to corrosion.

If buried corroding steel is made a cathode, its true potential with respect to adjacent earth remains constant when the current flowing to the cathode is increased, until the local corrosion currents have been overcome. Application of additional current changes the potential of the cathode in proportion to the logarithm of the additional current. The current just sufficient to change the potential of the cathode is the current required to prevent its corrosion.

The potential of a cathode with respect to a reference electrode in the earth, as usually measured, includes a drop due to resistance in the circuit, and this must be eliminated or deducted if the critical current is to be recognized.

Methods for accomplishing this have been worked out by K. H. Logan of the Bureau in cooperation with J. M. Pearson, I. A. Denison, R. F. Hadley, and A. V. Smith. The apparatus required is described in detail in a paper which has been submitted for publication in Petroleum Engineer. Results of using the new criterion for the current required to prevent corrosion are presented, and the results of using the old and new methods are compared.

SOIL-CORROSION CONFERENCE

The fifth Soil-Corrosion Conference, held in St. Louis, Mo., on March 25 to 27, was attended by over 50 people representing various private organizations, the War Department, Rural Electrification Administration, War Emergency Pipe Lines, and the Bureau. A total of 48 papers were submitted for exchange in advance and were discussed at the meeting. Two were by members of the Bureau's staff. The first, by Kirk H. Logan, was entitled "The Determination of the Current Required for Cathodic Protection." The second, by Melvin Romanoff, dealt with "Effect of Aeration on the Hydrogen-Ion Concentration of an Anaerobic Soil." Particular interest was shown in the problem of cathodic protection of pipe lines. Mr. Logan was urged to demonstrate, at the annual meeting of the Petroleum Industry Electrical Association, the equipment which has been developed to show when cathodic protection is adequate. Two pipe-line companies have requested the Bureau's cooperation in using the apparatus to study conditions on their lines.

WATERPROOFINGS FOR UNIT-MASONRY WALLS

Building walls in exposed locations are sometimes penetrated by wind-driven rain with subsequent damage to plaster and interior trim. The effectiveness of cement-water paints and of other waterproofings for unit-masonry walls was studied by Cyrus C. Fishburn and Douglas E. Parsons, who measured the water-permeability before and after treatment of small wall specimens that leaked when exposed to simulated service conditions. The durability of some of the treatments was measured by again testing the walls after they had been stored outdoors for 1 or 2 years.

Cement-water paints were found to be highly resistant to water penetration and were more effective than emulsified resin or oil base paints. The cement-water paint coatings were durable and proved effective as waterproofings after 1 or 2 years of exposure, although some of the specimens were so weather-stained that their repainting might have been considered desirable from the standpoint of appearance. On rough-textured concrete block walls, the cement-water paint coatings were most effective when applied with stiff, fender-cleaning brushes rather than with soft-bristled whitewash or paint brushes. The admixture of fine sand in the first coat of paint applied to walls of rough-textured units, such as cinder-concrete block, was highly effective. Such coatings were durable and contained few or no pin holes. Coatings made of cement-water paint of thin consistency were more permeable than those made from a paint of medium consistency, but heavy applications of a medium consistency paint were less durable than thinner coatings of the same paint. Cement-water paint coatings applied to dry walls were more permeable than similar coatings applied to backings that had been wetted and were damp when painted.

Colorless waterproofing materials were of little or no benefit as waterproofing when applied to walls that leaked badly. Of the colorless materials tested, only one was effective, and walls treated with it were highly permeable when again tested after they had been exposed outdoors. The only effective and durable waterproofing treatment for brick walls that did not change the appearance of the walls, was repointing or grouting of the face joints.

Bituminous coatings applied to the inside, unexposed, faces of the specimens were ineffective as waterproofings and were badly blistered after a test exposure lasting 1 day. Brush coatings of portland cement and sand were more effective than bituminous coatings, but were not as effective as trowel coatings of cement and sand prepared with or without admixtures of powdered iron and salammoniac (iron waterproofing).

The complete account of this work will be found in Building Materials and Structures Report BMS95, copies of which are obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 15 cents each.

PROPERTIES OF POROUS CONCRETE

Building Materials and Structures Report BMS96 by Perry H. Petersen describes an investigation into the phys-

ical properties of a type of porous concrete consisting solely of portland cement, water, and uniform size gravel. Each of three coarse aggregates, grits (No. 8 to No. 4), pea gravel (No. 4 to ⅜ in.), and ¾-in. gravel (⅜ to ¾ in.), was used, with 2½ bags of cement per cubic yard in concrete tamped in place, and 3 bags per cubic yard when no compacting was done. Walls, wallettes, beams and bond pull-out specimens were tested, as well as 6- by 12-in. control cylinders. Compressive, transverse, shearing, and bond strengths are reported, as well as resistance to heat transfer, water penetration by capillarity and rain penetration.

The results obtained are as follows: The weight per cubic foot tended to increase with increase in size of aggregate, with a range of 97 to 105 lb/ft^3 for that placed loose, and 110 to 115 lb/ft^3 for that tamped in place. The water-cement ratio, by weight, however, decreased with increase in size of aggregate, ranging from 0.50 to 0.40 for the loose and 0.50 to 0.44 for the tamped concrete.

The modulus of rupture for the monolithic walls was about 100 lb/in.^{2} tending to be slightly less than this value for the concrete placed loose and more for concrete placed by tamping. This value is about one-fourth of that expected for a dense concrete with a compressive strength of 2,500 lb/in.^{2}. The transverse strengths of walls containing a horizontal construction joint were considerably less than for walls with no joint; with the tamped porous concrete, the strength of the joint averaged less than 25 percent of that of the monolithic wall.

The compressive strength of the tamped cylinders ranged from 600 to 900 lb/in.,^{2} and was a fair indication of the strength in walls 8 ft high and of the same mixture. When the concrete was placed loose, the walls yielded strengths of 500 to 650 lb/in.,^{2} these values being 50 to 150 lb/in.^{2} higher than the strengths of their respective cylinders. The values for secant modulus of elasticity at a stress of 200 lb/in.^{2} ranged between 1 and 2 million lb/in.^{2}, tending to increase with increased size of aggregate.

Resistance to heat transmission decreased as the size of aggregate increased, the values of thermal transmittance U, varying from 0.64 to 0.87 BTu per hour per square foot per °F for 6-in. walls, these being the corrected values for a 15-mph wind outside and zero wind inside, as recommended by the ASHVE "Guide." The "Guide" lists U values of 0.77 to 0.88 for dense concretes of various ages and mixtures.

Resistance to rain penetration of walls to which ⅛-in. stucco was applied was excellent, and the coefficient of thermal expansion averaged 0.000006/°F, approximating that of the gravel used as aggregate.

The amount of shrinkage ranged from 0.009 to 0.052 percent for the dry walls and seemed to decrease with increase in size of gravel and with the amount of compacting.

The rise of water by capillarity in walls of porous concrete ranged from 3 to 6½ in. at 7 days, the greater value occurring in the concrete using grits placed loose.

The bond stress at first slip between reinforcing steel and tamped porous concrete using pea gravel and 2½ bags of cement per cubic yard was about three-fourths of that obtained for a regular concrete with a compressive strength of 2,500 lb/in.^{2} However, the maximum bond strength developed by the pull-out specimens of porous concrete was only about one-third that of the ordinary concrete.

The computed shearing stress in the beams at failure was about 80 lb/in.^{2}, this value being about one-half of that expected for a regular concrete with a comprehensive strength of 2,500 lb/in.^{2} The resistance to failure by diagonal tension did not change appreciably when the reinforcing bars were coated with a cement-water grout immediately before placing.

Copies of BMS96 are obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 10 cents each.

EFFLORESCENCE ON PLASTER AND MASONRY

Efflorescence occurs as a deposit of crystalline salts on the surface of plaster or masonry. The salts ordinarily are present in the interior of the wall and are dissolved by water, transported to the surface and there deposited by evaporation.

The complete results of a recent study of efflorescence on plaster and masonry, by Dana L. Bishop, will be found in the Journal of Research for May (RP1538). Magnesium sulfate, although not a constituent of plaster white coat or base coat, was found to be a constituent of efflorescence. Its formation is explained by the reaction of water and CO_2 with the white-coat plaster. Carbon dioxide converts the magnesia to slightly soluble $MgCO_3$.

$3H_2O$ which reacts with gypsum to form $MgSO_4$. Magnesium sulfate was produced experimentally by the action of CO_2 on a water suspension of MgO and $CaSO_4 2H_2O$. Hydrated magnesium sulfate efflorescence also was formed on white-coat plaster specimens containing dolomitic hydrated lime and gypsum when treated with moist CO_2 under pressure and then allowed to dry. The disintegration accompanying efflorescence is caused by the large volume changes involved in the formation and crystallization of $MgCO_3.3H_2O$ and $MgSO_4.7H_2O$.

Since moisture is necessary for the formation and transfer of these salts, plaster when kept dry does not effloresce.

$MgSO_4$ also is found as efflorescence on cement products, possibly being derived from MgO and sulfate in the cement by reaction with CO_2 and water. The compound $3CaO.Al_2O_3.3CaSO_4.31H_2O$, a constituent of cement, was decomposed by CO_2 and water, making $CaSO_4$ available for reaction with $MgCO_3.3H_2O$ to form soluble $MgSO_4$.

HYDRATED CALCIUM ALUMINATES

The extensiveness of the literature that has grown around the hydrated calcium aluminates is proof of the scientific interest in and technological importance of these compounds. Nevertheless, it was felt at the Bureau that a study should be made of the system $CaO-Al_2O_3-H_2O$, particularly as regards phase equilibria. This was not alone because of its direct bearing on the setting and hardening of high-alumina and portland cements, but also on account of possible applications in the fields of geology, soil equilibria, water purification, and the extraction of alumina from crude bauxite. Such a study was, therefore, undertaken by Lansing S. Wells, W. F. Clarke, and H. F. McMurdie. As a result, diagrams have been constructed showing the solubilities of the various phases at temperatures of 21° and 90° C. The following is an abstract of the report which will be published as RP1539 in the May number of the Journal of Research.

The solid phases were investigated by petrographical and X-ray diffraction methods. By means of the diffraction patterns, it was found that the so-called hexagonal tricalcium aluminate hydrate is in reality a mixture of hexagonal $2CaO.Al_2O_3.8H_2O$ and hexagonal $4CaO.Al_2O_3.13H_2O$ intercrystallized in equimolecular proportions. On standing, dry dicalcium aluminate hydrate is slowly converted into the tetracalcium aluminate hydrate and hydrated alumina. Loss of water of hydration in the tetracalcium aluminate hydrate results in a decrease in the unit cell along the c axis.

Although the hexagonal di- and tetracalcium aluminate hydrates exist only as metastable phases in the system $CaO-Al_2O_3-H_2O$ between temperatures of 21° and 90° C, their approximate solubility relationships were ascertained at 21° C. There appears to be a metastable invariant point for these two solid phases and a solution containing between 0.5 and 0.6 g of CaO per liter and 0.10 and 0.15 g of Al_2O_3 per liter. As the temperature increases the hexagonal aluminates become less stable.

The only stable solid phases that occur in the system $CaO-Al_2O_3-H_2O$ over the temperature range from 21° to 90° C are: Gibbsite, $Al_2O_3.3H_2O$; the isometric tricalcium aluminate hexahydrate, $3CaO.Al_2O_3.6H_2O$; and $Ca(OH)_2$.

The solubility curves of gibbsite and isometric $3CaO.Al_2O_3.6H_2O$ in the system $CaO-Al_2O_3-H_2O$ were determined at 21° and 90° C. Over this temperature range, gibbsite is the stable phase up to a concentration of 0.33 g of CaO per liter; at concentrations greater than this, the isometric hexahydrate is the stable phase until those points are reached at which $Ca(OH)_2$ also appears as a solid phase. The invariant points for gibbsite and the isometric phase occur at a concentration of 0.33 g of CaO per liter, but with the concentration of Al_2O_3 increasing from 0.02 g of Al_2O_3 per liter at 21° C to 0.11 g of Al_2O_3 per liter at 90° C.

ELECTROMETRIC TITRATIONS

A paper by Roger G. Bates, Gerda L. Siegel, and S. F. Acree in the May Journal of Research (RP1537), reports an improvement in the method of electrometrically titrating a weak monobasic acid to determine its dissociation constant and the pH values of buffer solutions prepared from the weak acid and its salts.

It is often desirable to determine pH values for a series of mixtures of a weak acid and its salts with precision greater than that obtainable by the usual practical pH assembly with liquid junction, which may give results in error by 0.02 to 0.05 pH unit. In principle, electrometric titration is well suited for a rapid determination of the pH changes in the neutralization of a weak acid. In practice, however, the limited accuracy of the results has been

responsible for the gradual adoption of more precise methods for determining dissociation constants and pH values.

Two modifications have been suggested which improve the accuracy of the titration method and extend its usefulness. In the present paper, it is shown that an electrometric titration, performed (a) in a cell without liquid junction and (b) under conditions of unchanging ionic strength, is capable of yielding dissociation constants accurate to about 0.01 unit. The improved method was checked by a determination of the titration curves and dissociation constants of formic and acetic acids.

SIMPLIFIED PRACTICE RECOMMENDATION FOR WINDOW SHADES

At the request of the Window Shade Institute, representing the manufacturers of cloth shades, the Division of Simplified Practice assisted the industry in drafting Simplified Practice Recommendation R199–43, Cloth Window Shades. The recommendation lists yarns per inch, number of colors, widths, finishes, and characteristics for the kinds of cloth from which stock shades are made; also dimensions of mounted stock shades; and diameters and grades of rollers.

In proposing this recommendation, the sponsors felt that a reduction-in-variety program would not only help to conserve materials and manpower, but would also benefit the entire industry through simplification of the processes of manufacture and distribution. The inclusion of details as to construction and finish of cloth, color fastness, clean-ability, etc., would, moreover, provide consumers with a convenient guide for determining quality and serviceability of the various kinds of shades.

According to information compiled by the Window Shade Institute, this recommendation, if generally adhered to, will reduce, by nearly 70 percent, the kinds and widths of shade cloth manufactured for stock. The simplification which has been effected in both the shade cloth and mounted shades should enable the industry to maintain essential production, under war restrictions. With production and consumption concentrated on the retained varieties, the tying up of materials in slow-moving inventories of manufacturers, wholesalers, and retailers will be largely obviated.

The publication includes a brief history of the project, and lists the acceptors. Until the printed edition is available, free mimeographed copies of R199–43, which became effective on March 1, 1943, may be obtained from the Division of Simplified Practice, National Bureau of Standards, Washington, D. C.

SIMPLIFIED PRACTICE RECOMMENDATION FOR HEAVY FORGED HAND TOOLS

The War Production Board in 1942 requested the Bureau to work out a further simplification of the line of tols shown in Simplified Practice Recommendation R17–35 as a means of conserving critical metals and making the most effective use of the limited supply.

As first promulgated in 1924, Recommendation R17 established a simplified list of weights, sizes, and types of forged tools that showed a reduction of almost 50 percent from the then existing variety. In 1927 the recommendation was revised by the addition of eye sizes and shapes, and in 1931 its scope was further enlarged to include a simplified list of railroad and other industrial tools, as well as lengths for hammers, mauls, and sledges, only the weights of which had been previously given. A third edition, which became effective in 1935, covered mainly the addition of certain tools to meet requirements of the manufacturers' NRA code.

In July 1942, a proposed revision of Recommendation R17–35 was prepared in collaboration with the War Production Board and representatives of the manufacturers. This draft, with certain modifications, was approved by the Heavy Forged Hand Tool Industry Advisory Committee, and issued by the Board as Schedule IV to Limitation Order L–157, Hand Tools Simplification, to be effective November 3, 1942. To take care of some changes proposed by the manufacturers after the schedule went into effect, an amendment to Schedule IV was issued on February 25, 1943.

Under this schedule, 351 types and sizes of heavy forged hand tools are permitted to be manufactured. It covers tools that have heretofore been offered in approximately 1,170 varieties, of which 70 percent have been eliminated. Included in the 819 eliminated items are about 300 varieties of 78 tools that have been discontinued altogether.

This simplified list has also been approved as an emergency revision of Recommendation R17–35, which will be reissued as R17–43, Heavy Forged Hand Tools. The kinds of tools covered are as follows: Bars; blacksmiths' anvil tools; hammers, mauls, and sledges; hoes, mat-

tocks; picks; railway track tools; tongs; wedges; and mine blasting tools, mine breast drills, and miscellaneous tools.

After the emergency, the recommendation will again be subject to regular review for revision or reaffirmation by the industry's standing committee.

COMMERCIAL STANDARD FOR SCREW THREADS AND TAP-DRILL SIZES

Under the title Screw Threads and Tap-Drill Sizes, Commercial Standard CS24–43, the Bureau of Standards has released a second edition of American National Standard and Special Screw Threads, CS24–30 and CS25–30.

The revised standard is somewhat wider in scope than the previous editions of the two standards which it consolidates. It provides the essential specifications, definitions, symbols, and dimensional data on the predominating sizes and classes of fit of American National Screw Threads in the six following series: Coarse, fine, extra-fine, 8-pitch, 12-pitch, and 16-pitch. Corresponding to these are six tables of stock tap-drill sizes, with dimensional data on diameters and depths of threads.

For the protection and guidance of the purchaser, the publication includes a recommended uniform wording of a statement to be incorporated in labels, invoices, catalogs, etc., guaranteeing that screw threads of the respective classes of fit conform to the standard.

The standard became effective for new production on February 10, 1943. Copies are available from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 10 cents each.

COMMERCIAL STANDARD FOR WARM AIR FURNACES EQUIPPED WITH VAPORIZING POT-TYPE OIL BURNERS

The Bureau has just released Commercial Standard (Emergency) CS(E) 104–43, entitled, "Warm Air Furnaces Equipped with Vaporizing Pot-Type Oil Burners," which has been accepted by the industry as its standard of practice, effective for new production from January 1, 1943.

The Standard records, for the benefit of all concerned, the performance requirements and methods of test for oil-burning furnaces with either gravity or forced air circulation. It includes construction and design requirements, definitions, publication of furnace ratings, and labeling for the information of the purchaser. The wording of a uniform guarantee and a list of the manufacturers, distributors, installers, testing laboratories, and user organizations that have officially accepted the standard are also included.

The pamphlet is available at 10 cents a copy from the Superintendent of Documents, Washington, D. C.

COMMERCIAL STANDARD FOR BOYS' PAJAMAS

Commercial Standard (Emergency) CS (E)106–43 for boys' pajamas, which is now available in printed form, provides standard methods of measuring and standard minimum measusements for boys' pajamas, whether made from shrunk or unshrunk fabrics.

The establishment of this emergency standard was requested by the Office of Price Administration on November 27, 1942, as a guide for producers, distributors, and users in an effort to conserve essential materials; to eliminate confusion resulting from a diversity of methods and measurements, and to provide a uniform basis for guaranteeing full size.

The printed edition carries a recommended wording for a guaranty label, together with a brief history of the project, a list of official acceptors, and a roster of the standing committee charged with keeping the standard abreast of progress in the industry. The standard became effective for new production on April 10, 1943. Printed copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C. at 5 cents each.

NEW AND REVISED PUBLICATIONS ISSUED DURING APRIL 1943

Journal of Research[2]

Journal of Research of the National Bureau of Standards, volume 30, number 4, April 1943 (RP1531 to RP1536, inclusive). Price 30 cents. Annual subscription, 12 issues, $3.50.

Title page, corrections, and contents for Journal of Research, volume 29. July to December 1942 (RP1480 to RP1512, inclusive). Free on application to the Bureau.

[2] Send orders for publications under this heading only to the Superintendent of Documents, Government Printing Office, Washington, D. C. Subscription to Technical News Bulletin, 50 cents a year; Journal of Research, $3.50 a year (to addresses in the United States and its possessions and in countries extending the franking privilege); other countries, 70 cents and $4.50, respectively.

Research Papers[2]

[Reprints from the January, February, and March 1943 Journal of Research]

RP1515. An improved electrode holder for spectographic analysis. Bourdon F. Scribner and Charles H. Corliss. Price 5 cents.

RP1519. Analytical separations by means of controlled hydrolytic precipitation. Raleigh Gilchrist. Price 5 cents.

RP1522. Measuring the degree of curl of paper. Frederick T. Carson and Vernon Worthington. Price 5 cents.

RP1523. Combination of wool protein with weak acids. Jacinto Steinhardt, Charles H. Fugitt, and Milton Harris. Price 5 cents.

RP1528. Part-wool blankets for use in barracks. Herbert F. Schiefer, Louis R. Mizell, and F. T. Mosedale. Price 5 cents.

RP1529. Advantages of a blanket-and-sheet combination for outdoor use. Herbert F. Schiefer. Price 5 cents.

RP1530. Composition and physical properties of aqueous extracts from portland cement clinker pastes containing added materials. George L. Kalousek, C. H. Jumper, and J. J. Tregoning. Price 10 cents.

Building Materials and Structures Reports[2]

[Persons who wish to be notified of new publications in the Building Materials and Structures series as soon as they are available should write to the Superintendent of Documents, Government Printing Office, Washington, D. C., asking that their names be placed on the special mailing list maintained by him for this purpose.]

BMS95. Tests of cement-water paints and other waterproofings for unit-masonry walls. Cyrus C. Fishburn and Douglas E. Parsons. Price 15 cents.

BMS96. Properties of a porous concrete of cement and uniform-sized gravel. Perry H. Petersen. Price 10 cents.

Circulars[2]

C443. Maintenance of elevator hoistway and car enclosures and equipment. Price 5 cents.

C444. Maintenance of elevator hoising machines and brakes. Price 5 cents.

Simplified Practice Recommendations[2]

R85–43. Adhesive plaster. (Supersedes R85–37.) Price 5 cents.

R191–43. School tables. Price 5 cents.

R198–43. Wire rope. Price 10 cents.

[2] See footnote no. 2 on p. 39.

Commercial Standards[2]

CS24–43. Screw threads and tap-drill sizes. (Revision and consolidation of CS24–30 and CS25–30.) Price 10 cents.

CS(E)104–43. Warm-air furnaces equipped with vaporizing pot-type oil burners. Price 10 cents.

CS(E)106–43. Boys' pajamas (made from woven fabrics). Price 5 cents.

Technical News Bulletin[2]

Technical News Bulletin 312, April 1943. Price 5 cents. Annual subscription, 50 cents.

MIMEOGRAPHED MATERIAL

Letter Circulars

[Letter Circulars are prepared to answer specific inquiries addressed to the National Bureau of Standards and are sent only on request to persons having a definite need for the information. The Bureau cannot undertake to supply lists or complete sets of Letter Circulars or send copies automatically as issued.]

LC708. Aeronautics: Publications by the staff of the National Bureau of Standards. (Supersedes LC524.)

LC720. Electric batteries and standard cells: Publications by the staff of the National Bureau of Standards, and references to other sources of information. (Supersedes LC656.)

LC722. List of commercial standards. (Supersedes LC713.)

RECENT ARTICLES BY MEMBERS OF THE BUREAU'S STAFF PUBLISHED IN OUTSIDE JOURNALS[2]

Light-and-shadow box as a visual aid in measuring spectra. John J. Hopfield. J. Optical Soc. Am. (175 Fifth Ave., New York, N. Y.) 33, 113 (February 1943).

Advances in plastics during 1942. G. M. Kline. Mechanical Engineering (29 West 39th St., New York, N. Y.) 65, 245 (April 1943).

Effects of prior fatigue-stressing on the impact resistance of cromium-molybdenum aircraft. J. A. Kies and W. L. Holshouser. NACA Technical Note No. 889 (Nat'l. Advisory Com. for Aeronautics, Washington, D. C. (March 1943) (Restricted distribution.)

[2] These publications are not obtainable from the Government, unless otherwise stated. Requests should be sent direct to the publishers.

An improved volumenometer. J. C. Richmond, J. B. Peterson, and W. H. Herschel. J. Am. Ceramic Soc. (2525 North High St., Columbus, Ohio) 26, No. 4, 127 (April 1943).

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